

# SUPPLEMENT.

## The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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### THE ISLAND OF EASDALE.—No. II.

BY JOHN WHITE, LATE MANAGER.

EASDALE SLATES have been long celebrated, and not a few have sat under their substantial shelter in the mansions of the nobility, as well as in the public buildings and humble dwellings of the towns and cities of Scotland. The precise date when Easdale slates were first used for roofing houses cannot now be ascertained; but they are found on some of the oldest buildings in the country. Ardmaddy Castle, a seat of the Marquis of Breadalbane, built in 1676, is roofed with them. They are fastened on with wooden pins, and there has yet been no necessity for re-slating, neither has been much repair required.

Caistean-an-Stalcair, or Falconer's Castle, at Appin, was roofed in 1631 with Easdale slates, and it is said that round the ruins of a castle in the North of Scotland, at least double the age of those mentioned, there are fragments of slate evidently from Easdale. It is extremely probable that Easdale would be among the first places in Scotland that suggested the idea of using slates for roofing purposes. There the strata are distinct, of convenient size, and not unfrequently unconnected with those above and below them, while they are exposed on the sea beach, where the beating of the surf has sufficient power to detach blocks of the rock, and hurl them against the parent mass with such force as, from their easy cleavage, to split them into thin slabs; and of this an examination of the beach affords abundant proof. The fisherman, erecting a temporary hut, would require no great ingenuity to use these ready-made slabs for its construction, and when the fishing season was over, their admirable adaptation for roofing purposes would, no doubt, suggest to him the propriety of carrying away in his boat a cargo to cover his more permanent abode.

Slate quarrying in Easdale was commenced on the sea shore, to which it was long confined. The power first applied for detaching blocks of slate strata, as handed down by tradition, was very simple and original. Wedges of seasoned oak and other hard wood were driven into the cleavage seams at low water, and as the tide flowed the wood expanded, and accomplished slowly and uncertainly what is now done quickly and effectively by the use of gunpowder. After gunpowder was employed the sea shore was wrought down to low water level before the seams in the interior were resorted to. During this period, as operations could be carried on only at low water, the men were often assisted by their wives and children, who might be seen busily employed, some with handbarrows, others with creels on their backs, carrying slates and slate blocks to places beyond the reach of the flowing tide. When the slate rock at the sea shore was wrought as low as practicable, the workpeople had so little expectation of finding employment any longer, that several of them left the place.

We have thus alluded to what may be called the first period of slate quarrying. The slate seams wrought at the sea shore would have been followed further into the interior, had it not been for the trap dykes, which pass right through them, and divide them, as it were, into compartments. This was, in those days, no inconsiderable obstacle. The only way known to the workmen for getting rid of the water which collected in the workings was to run it off at low tide. For that purpose they had, at great expense of time and labour, to cut a trench at low water level from the sea shore to the working. Into the trench they built a close wooden trough, in which they fitted a plug, running off the surface water at ebb tide, and shutting out the sea at flow. Such was the state of hydraulic engineering in Easdale in those days.

By such appliances, almost every place in which good slate was to be found in the island was wrought down to low-water mark, and so confident were the workmen that the quarries would never be wrought deeper, that a spot is pointed out where one of them fired a blast on the shore, at an unusually low state of the tide, exclaiming, in a boasting tone, "That is the lowest blast that will ever be set off in Easdale." Slate quarrying on the island was thus, a second time, considered at an end. During this period wheelbarrows were used for conveying the slates to the boating places, handbarrows having been used previously, and not unfrequently the workmen carried the slates on their backs. Towards the latter end of this period coals came into use, peat having been the only fuel employed previous to the year 1805, a stipulation having been regularly inserted in the farm leases of Kilchattan, in the island of Luing, by which the tenants were bound to prepare a stated quantity of peat fuel for the slate quarries of Easdale.

The third period may be reckoned from the time when the primitive drainage system was superseded, and the quarries were sunk to a greater depth than such a contrivance permitted, to the introduction of the steam-engine. During the early part of this period a considerable portion of the men's time was occupied in removing the mounds of rubbish accumulated by previous operations, and that they did by the use of wheelbarrows. About this time the quarries were regularly laid out in pitches, 9 yards in length of the seam being allotted to each gang, or party of three men and an apprentice, or servant.

The pump used for unwatering the quarry in which the first sinking was commenced was that of some unfortunate castaway vessel. That was succeeded by a fly-wheel pump, wrought by handles like a winch, and the working of this pump excited great admiration. As different quarries were opened, more powerful and complicated pumping machines were constructed. The first of these was a Newcomen's atmospheric engine, which quite eclipsed the fly-wheel, and was looked upon by the simple islanders as a perfect wonder. Some parties who witnessed its performance state, however, that it wrought unsatisfactorily, which might have been expected, considering the fact that its boiler was a square box of cast-iron, 1 inch thick, and its piston packed with leather! The next pumping-machine was a gin, which was put in operation about the year 1807, and the horse that worked in it was the first employed on the island. The gin was found to do well, and others were constructed. Additional horses were required, and this led to the adoption of carts instead of wheelbarrows. About the same time another machine was introduced, and excited anew the wonderment of the natives. It was a windmill, with arms 16 ft. long and 5 ft. broad. With an ordinary breeze it worked very effectively, raising water from one of the quarries, 50 ft. deep, by a pipe 7 inches in diameter. This windmill was in use for 20 years. The depth to which the quarries were sunk while pumped by horse-power was about 40 feet.

In 1825 a second sinking of some of the quarries was commenced, and continued to a depth of above 80 feet. To draw the water from that depth required more powerful machinery than any on the island; and in 1826 an atmospheric steam-engine was erected in such a situation as to be avail-

able for pumping three quarries, which it continued to do until 1846, when it was superseded by a more powerful engine. Besides the erection of improved machinery during this period, facilities were afforded to vessels for the discharging and shipping of cargoes at wharves erected for the purpose, such processes having been previously accomplished by boats, while the vessels lay at anchor in the Sound.

The late Marquis of Breadalbane succeeded to the title and estates in 1834, soon after which he visited this corner of his vast possessions, and, after consulting the manager, agreed upon a plan for the application of machinery in raising the slates from the quarries, then becoming too deep to be wrought much longer in any other way. A railway incline, worked by horse-power, was the first contrivance resorted to, and this was found to be a vast improvement upon the previous plan of conveying the slates to the surface by a zig-zag road in the side of the quarry. The writer constructed the first railway incline in 1836, and others were soon after applied to all the quarries. The next improvement was the connection of the railway machinery with the steam-engines, by which above a dozen horses were got rid of, their maintenance having been a considerable item in the list of working expenses. The Easdale Quarries had long been leased to a company in which the proprietor was only a shareholder, but at the expiration of the lease, in 1841, the quarries came into the Marquis's own hands. While in the employment of the company, the quarries were paid only once a year, and that merely for the slates disposed of. The proprietor paid them more frequently, and for work done without reference to sales, a plan which has been pursued ever since. Several quarries that had been wrought were becoming exhausted, when, in 1850, attention was directed to some that had long been full of water and the refuse of former workings. The quarry formerly pumped by the windmill being the principal one, in 1851 a more powerful steam-engine than any hitherto erected was procured, and set in operation for clearing it out. From that time to the end of 1861 about 450 tons of loose rock were taken out of it, by far the greater portion of which was cast into the sea as rubbish.

The space between two of the larger trap-dykes that intersect the slate is usually wrought as a quarry. That space is measured off in sections, and let to a party of quarriers, who commence by sinking to a depth of 30 or 40 feet, and then work on at that level till the seam is crossed, or lost by dipping abruptly under a mass of coarse slaty rock, commercially worthless. The sinking is then repeated from the low level. Some of the quarries are now 150 feet deep, and they will probably be carried much deeper. In working a slate quarry gunpowder is indispensable, but it must be used in moderation. The thickness and quality of the stratum, the size, depth, and position of the bore must be carefully considered, and the charge regulated accordingly, as it may either be too small to produce the desired effect, or so great as to shatter the rock and render it useless. The object to be aimed at by the use of gunpowder is the detaching of considerable blocks of rock, to be afterwards split up, with mauls and wedges, into thin slabs, to be divided and dressed into finished slates of the desired size.

The following are the slates usually made at the quarries:—Duchesses, 24 inches by 12; Countesses, 20 inches by 10; Sizeables, about half the dimensions of Countesses; and Undersize slates, half that of Sizeables. From 1842 to the close of 1861, about 140,000,000 of slates of all sizes were made. The stranger's attention may be attracted by large slate slabs, set carefully up on end in the neighbourhood of the houses: these are the property of the quarriers, who usually bargain for the purchase of such slabs as they may fall in with suitable for headstones to mark their resting place after they have "shuffled off their mortal coil."

### MINING IN IRELAND.—No. XII.

[FROM OUR CORRESPONDENT IN THE COUNTY OF CORK.]

THE SHEEP'S HEAD DISTRICT.—The bold headland or promontory which faces the Atlantic Ocean, and divides Bantry Bay from Dunmanus Bay, is known on maps and charts as the Sheep's Head, and forms the extreme western point of the peninsula of Meintervarra, which varies in breadth from two to six miles, Bantry Bay being situated on the north side, and Dunmanus Bay on the south side of the peninsula. There is a good road from Carrigrohilly—a village at the head of Dunmanus Bay, to within a short distance of the Sheep's Head Tower, along the north shore of that beautiful but unfrequented bay. Turning round to the north-east, from the Sheep's Head Tower, and skirting the south shore of Bantry Bay some three or four miles, the old coastguard station is reached, and marked on the maps as Evanson's Cove; and a short distance further on is the Gurtavally Mine, which is now being worked, I am informed, by a Dublin proprietor, under the name of the Carberry Mines. It may not be uninteresting to some of the readers of the Journal to learn how the Gurtavally Mine was discovered. About 20 years ago Captain William Thomas, of the Schull Bay Mines, and a gentleman in Cork, employed an intelligent Cornish miner, and paid him for two years to search and examine all the cliffs, headlands, nooks, and corners, from Bantry, all round the coast, to Carrigrohilly, and the entrance to Cork Harbour, and also the whole of the intermediate districts; and when he found mineral indications in any particular spot, Captain Thomas carefully examined it, and thus became familiar with the most out-of-the-way places in the country, and, probably, with many places no other person but himself has yet examined, as, only for the system adopted of exploring what was then, in a mineral point of view, an entirely new district, such a place as Gurtavally might have remained unknown, as well as many other places in the county of Cork which were thus brought under notice, for generations to come. It was, therefore, by this little exploring expedition that Gurtavally Mine was discovered. The site of Gurtavally Mine, at that time, was as wild as any place could be imagined. There were lofty cliffs, with immense overhanging rocks, to descend which, and examine the lodes, was a perilous undertaking; but Capt. Thomas having formed a favourable opinion of the character of the lodes, which contained large quantities of quartz, gossan, and stones of yellow copper ore, the mine was taken up and operations begun in 1844, by clearing away thousands of tons of loose rocks in the face of the cliffs, and building with them two strong sea-walls at its base, thus enclosing and making convenient dressing-floors, and erecting smiths and carpenters' shops, close to the scene of operations. A shallow adit was driven a considerable distance east and west on the course of the lode, as a pioneer for deeper operations, and ascertaining the proper position for shafts, &c.; for it should be remembered that at the time I write about, the mine at Gurtavally was quite as new an undertaking as any unexplored mine in Australia. Subsequently the lode was intersected in a deep adit cross-cut, and driven on some distance east and west, and winzes sunk from the shallow adit to the deep adit; winzes were also sunk below the deep adit, east and west of the cross-cut, to the 8 and 16 fathom levels; and during these preliminary operations 90 tons of copper ore were raised, and sold in Swansea. A passage was cut in the side of the cliff for boats to come alongside, and the shipment of the 90 tons of ore was effected in 10 hours. Houses with slated roofs were erected for the working miners, and everything laid out for permanent working, when the country was visited with the terrible famine of 1846, which caused such a panic throughout Ireland, as for the time and for years afterwards to put an end to all speculations.

It is highly encouraging, however, as regards the mining interest of this country, to see that the capitalists of Ireland are coming forward to develop its mineral resources; and if other capitalists in this country would follow such a worthy example there is no doubt but Gurtavally, and many other mineral properties that may be selected, would, if worked in a judicious and economical manner, yield more ample and certain returns upon the capital invested than any of the foreign schemes which are being constantly brought before the public. The peninsula of Meintervarra consists of

clay-slate, micaceous and chloritic schists, porphyritic rocks, quartz, &c., and skirting the south shore of Bantry Bay, and the north shore of Dunmanus Bay, valuable slate quarries are being opened, and known, the former as Bantry Bay Slates and Slab Quarrying Company, and the latter as the Rosmore Slate Quarrying Company. I frequently hear it remarked by those who take pride in designating themselves "practical miners," and also by numerous "inspectors," that this country—the south-west of Ireland—is too slaty to produce copper ore. Says another, the slate rocks are too much on their edge to do any good. Says another, I do not like to see the lodes running with the cleavage of the slate rocks; and if I could see them running obliquely (counters), I should expect great results? Says another, the district is too far distant from the granite to do any good. So much for "practical opinions," freely given, and no reason but the above adduced as to the why and wherefore to the contrary. Let us, however, place facts against opinions. It is a fact that there is in the county of Cork one of the best copper mines in Europe; it is found in clay-slate, the lodes run with the cleavage of the rocks, and it is distant 100 miles from the granite. It is a fact that in other districts in this county the best copper mines are found where the lodes run with the cleavage of the rocks. It is a fact that a copper mine was worked in this county (in close proximity to one of the best copper mines in the United Kingdom) where the lodes run obliquely to the cleavage of the slate rocks, in which thousands of pounds were expended, and which proved to be a failure. It is a fact that the lodes in this county, although running with the cleavage of the slate rocks, are intersected and dislocated by numerous porphyritic ranges, cross-courses, faults, slides, and so forth, and hence, no doubt, the reason of their unproductiveness. There is another important fact in connection with copper mining, which will soon become patent to the world—that nearly the whole of the old and great copper-producing mines in Cornwall have ceased to produce copper. If the supply must be kept up, where is it to come from? Will men of capital look out in time, and secure the properties in the south-west of Ireland, which will yield the required supply, or will they waste their money in South America, Africa, or anywhere, rather than safely invest it at home?

### INSTITUTE OF MECHANICAL ENGINEERS.

The seventeenth anniversary meeting of members was held on Jan. 28, at the house of the Institution, Newhall-street, Birmingham.—Mr. ROBERT NAPIER, the President, in the chair.

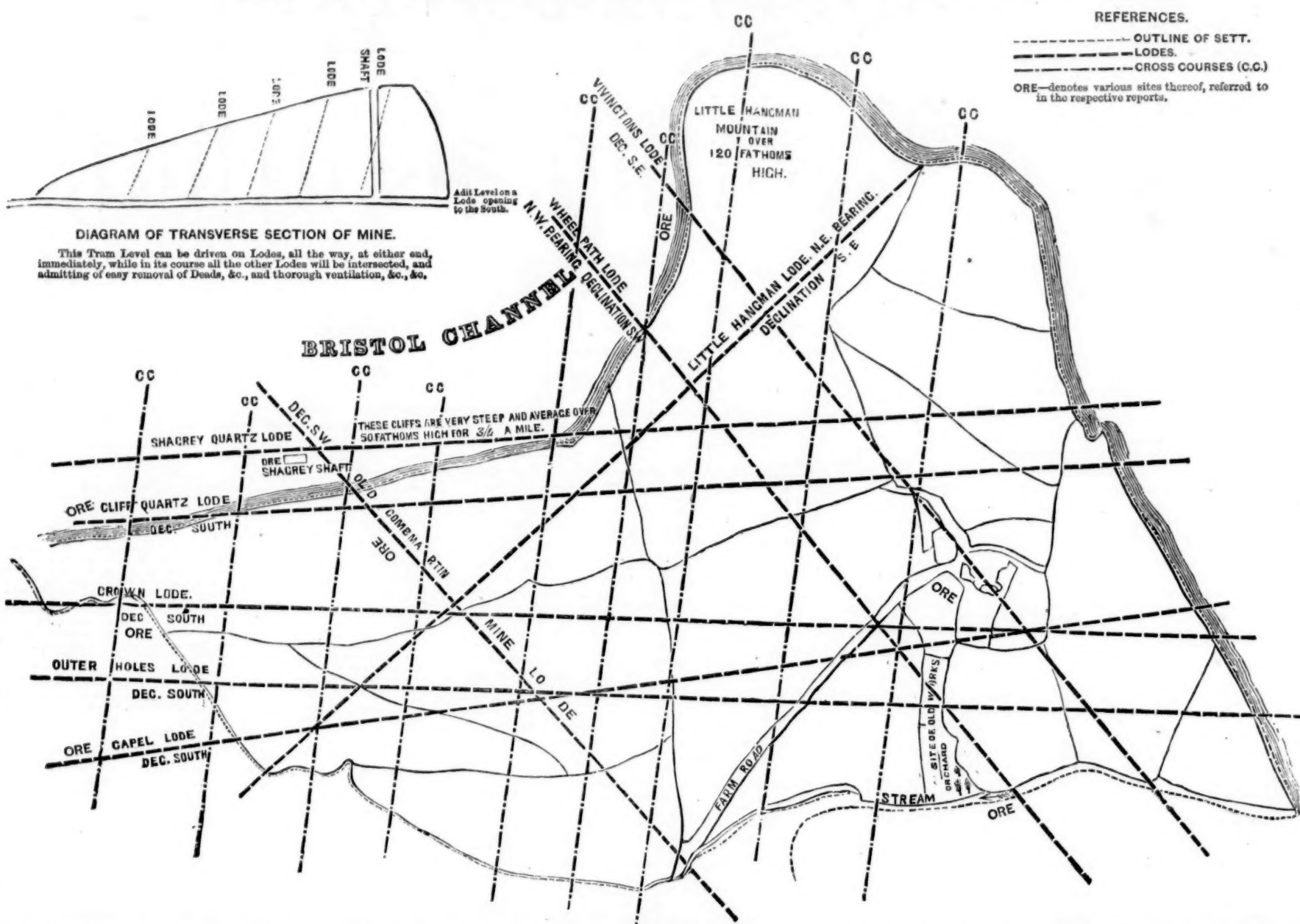
The SECRETARY (Mr. W. P. Marshall) having read the minutes of the previous meeting, the annual report of the council was then read, which showed the very satisfactory progress of the institution during the past year, and its prosperous condition, with a large increase in the number of members; referring also to the important annual provincial meeting held in Liverpool last summer. The usual election of officers then took place, Mr. Robert Napier being re-elected President of the Institution for the ensuing year; several new members were also elected.

The first paper read was a "Description of a Machine for Breaking Limestone and Ore, at Kirkless Hall Ironworks," by Mr. JOHN LANCAS-TER, of Kirkless Hall, Wigan. This machine, the invention of Mr. Blake, of Connecticut, is employed for breaking limestone and ore for blast-furnaces, and also stone and slag for metalling roads. It consists of a crushing hopper, in which the stone is broken between a pair of jaws, one fixed in the frame of the machine, and the other vibrating on a centre through a short distance, worked by an ordinary toggle joint, of simple and strong construction, and a long lever, which receives its motion from a crank shaft, driven by steam power. The crushing falls out of the jaws are cranked with alternate corrugations for breaking the stone; and the vibrating jaw is suspended at a small inclination to the fixed jaw, and is pressed forwards a short distance at each stroke by straightening the toggle joint at the back by means of the long lever, whereby a very powerful crushing action is obtained. The frame of the machine is of cast-iron, made of great strength, to resist the strain of breaking the stone. The material to be broken is fed in at the top between the jaws, by which it is gradually crushed and broken, until it is reduced to pieces small enough to fall out of the jaws, the space between the jaws at the bottom being adjusted according to the size to which the stone is required to be broken. The machine is driven at about 200 strokes per minute, and the quantity of limestone broken in regular work at the Kirkless Hall Ironworks is about 100 tons per day, or 10 tons per hour. The machine is found to have special advantages in its strength of construction and freedom from risk of damage, and in the small amount of wear and tear, in consequence of the parts subjected to the severe crushing strain being simple pressure pieces of cast-iron, of section of the jaws, the space between the jaws at the bottom being adjusted according to the size to which the stone is required to be broken. The machine is driven at about 200 strokes per minute, and the quantity of limestone broken in regular work at the Kirkless Hall Ironworks is about 100 tons per day, or 10 tons per hour. 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## GROUND PLAN OF NEW COMBMARTIN MINE SETT, COMBMARTIN, NORTH DEVON.

This Sett is supposed to be part of the North Combe (Valley) spoken of in Ancient History as being very productive for Silver Lead Ore.



The mining district of Combmartin, North Devon, possesses an historical date amongst the most early of any in the kingdom of which we have any account, having been successfully wrought for rich silver-lead ores as far back as the reigns of EDWARDS I. and II., HENRY V., and ELIZABETH, during which time it materially assisted in defraying the expenses of the civil wars. Nor might it have been closed so early, but for the interference of the wars in these parts more especially. At this period it was worked contemporaneously with the Bernalston Mines, and figuring more prominently than they. Each district has been resumed in recent times, with considerable success. The Tamar Mines were worked profitably to a depth exceeding 200 fathoms, and but for an accidental influx of water from the Tamar, continued proof of the richness of the group would be advanced.

The chief trial of the Combmartin district in recent times resulted, a few years since, in the development of some of the most enormous and productive masses of ore ever known, far surpassing, in the opinion of those who know both, the richest lead mines in Spain, having regard to the relative development of each mine. On an intelligent, judicious, energetic, and systematic trial why may not this district maintain its ancient prestige? Enough ore is now being raised from the North Devon mines to prove the character of the country to be very superior, and capable of comparatively any amount of profitable extension for mining purposes. These remarks are deduced on the appearance of the prospectus of the New Combmartin in the present MINING JOURNAL. And while other observations are written, they not only refer to Combmartin generally, but more especially to the ground possessed by that company.

The mining district of Combmartin possesses every possible geological feature and commercial consideration favourable to successful mining. The series of rocks in which it is placed by Prof. PHILLIPS corresponds with that in which are embedded the rich mines of the Harz, in Germany, the Pontpéan and Pontgibaud, in Brittany—viz., the Eifel limestone of the Middle Palaeozoic series. Probably, also, it is analogous to the rock of the rich Old Treburet, of North Cornwall. By Mr. N. WHITLEY they are considered the northern outcrops of the rich Liskeard series of lead mines, which view is sanctioned by some of the most eminent geologists. The rock is described by Sir H. DE LA BECHE as calciferous grits

and schists—in mining nomenclature, capel and killas, or clay-slate. It is of a blue colour, such as is always found in important argentiferous lead districts. Chemical or electrical forces have been exerted in a high degree in crystallising large amounts of quartz, carbonate of lime, carbonate of iron, &c., which minerals are usually associated with largest amounts of lead ore, containing a high silver produce. Extensive lime quarries are wrought in these rocks, for many miles lineally and transversely, a circumstance of paramount moment, as much lime is present in the vicinity of the best lead mines in all parts of the world, acting beneficially to mineral produce, as to agriculture or the human system. Freely, bold bands of quartz and crystalline rocks, assimilating elvan or porphyry, intersect the blue clay-slate, and expose, in places, rich ores in such quantities as almost to demonstrate the existence of highly profitable mines on the pursuit of the flookan lodes inland. These ranges essentially, comparatively hard, withstand, where exposed, the destruction of time and the elements, while the softer and more congenial lodes have been wasted, and their richer ores passed from the possibility of observation into the ocean. The intersections of quartz and porphyritic bands with the flookan lode in Old Combmartin Mine was attended by a great increase of ore. Cross-courses or faults, writes DE LA BECHE, are powerful and numerous along the cliff coasts, which with contortions have strongly succeeded the country, and which personal observation strongly attests. Alston Moor, PHILLIPS describes as shaken to pieces by ruptures, and therefrom argues its being the eminent mining district it is. Cross-courses here are consonant in the purpose assigned to them elsewhere—i.e., fertilisers of the lodes, though unfertile themselves. How well did they so act in causing those prodigious deposits of ore found in Old Combmartin lode in immediate contact with them, while their full influence, even there, remains to be proved. Truly they were royal feeders to the royal mines of ancient history. The cross-courses generally graduate from 20 feet wide to those minor forms, so grateful to the tributer from their profitable effects on his pitch. It being a mining axiom that ore-bearing zones pass in parallels to each other, on the line of cross-courses, it is favourable to find those already proved so beneficial pass into New Combmartin; more so as the axiom has been fully proved to hold good southward. The lodes—the vehicles of ores, *par excellence*—are numerous and masterly, running at the various angles of north-west, east

and west, and north-east, combining with the different angle of the cross-courses to form very many intersections of varying angles, a large proportion of which are the highly favourable ones of acute, where the largest deposits of ore are always found in any district. The nature, composition, and angle of bearing of the lodes of a mine being matters of essential importance, it is satisfactory to find in New Combmartin these can be scrutinised closely with advantage. They are well-defined, carrying bands of flookan, thus arguing great strength and continuity, lineally and vertically. The Old Combmartin lode produced ore 4 feet wide, solid, worth about 75*l.* per ton, at the depth of 120 fathoms. New Combmartin lodes carry abundance of friable quartz, carbonate of lime, carbonate of iron, and lead pyrites, all of which ingredients crystallise congenially with lead ores. Without questioning, as some do, which is the most favourable angle of bearing of lodes for production, the matrices of them all are of the highest class for good results; while their angles comprehend all the varieties; so that if one be better than another there is a choice. Lodes and cross-courses are here visible in cliffs from 100 to 200 fathoms high, cleaving their unfinishing course from unascertained depths upwards to the cliff summits. Well does a recent correspondent advise the study of mining in cliffs; well is it in your last impression suggested generations yet to come shall be wiser than we, nor die from want of further employment. The sub-alpine range of hills, forming the boundary of the North Combe, of which New Combmartin forms a part, is of *chiefest* historical repute for ore, while old surface mining works are there identical with those which initiated the productive discoveries of Old Combmartin Mines. The abundance of the richest ore, crystallised on the cleavage faces of the rocks here, on any section, for any distance, is truly remarkable. Boulders of solid ore, varying from pounds to hundredweights, lie about the disintegration of the lodes. With these favourable evidences, what may be expected on an ordinary satisfactory trial but a thorough maintenance of the extraordinary repute held of Combmartin district? What but an accession to that repute which shall compare advantageously with the most esteemed of mines? A mine which, as New Combmartin, can be worked at three-quarters less expense than 19 out of 20 mines, it is hoped may be carefully considered on its merits by investors, to the prospectus of which we take leave to refer them for the present.

## THE NEW COMBMARTIN SILVER-LEAD MINING COMPANY, LIMITED.

Registered under the Companies Act, 1862, whereby the liability of the shareholders is strictly limited to the amount of their respective shares, and Table A in the Act adopted as the rules and regulations of the company.

Capital, £16,000, in 8000 shares of £2.

5*s.* to be paid on application, and 10*s.* on allotment.

No further call to be made until the expiration of a year; and then no instalment to exceed 5*s.* per share, nor at intervals of less than three months.

## DIRECTORS.

BASSET SMITH, Esq., Elm-court, Temple, Deputy-Chairman of the Tewkesbury and Malvern Railway.  
JAMES BANCKS, Esq., Broxbourne, Heris, Director of the Tamar, Kilt Hill, and Cal-Major-General SHORTEDE, the Rowans, Lee-road, Blackheath.  
MOFFATT C. W. HORNE, Ilfracombe, and Guildford-street, London, W.C.  
WILLIAM YOUNG, Esq., Bath House, Instow, Devon, J. F.  
JOHN A. PARRY, Esq., Holland House, Barnstaple.  
PHILIP STONEHAM, Esq., Ilfracombe, F.R.C.S.  
BANKERS—London: The City Bank, Threadneedle-street.  
Barnstaple: West of England and South Wales District Bank.  
SOLICITORS—Messrs. Frichard and Collette, 87, Lincoln's Inn-fields, W.C.  
BROKER—Mr. Edward Cooke, 75, Old Broad-street, E.C.  
SECRETARY—Mr. George Frederick Goodman.  
OFFICES,—7, GEORGE YARD, LOMBARD STREET, E.C.

## PROSPECTUS.

The object of this company is to explore and work a very valuable piece of mineral ground situated in the silver-lead district of Combmartin, in the north of Devon, which in ancient and modern times produced so much wealth, the grant of which valuable ground this company have succeeded in obtaining after much negotiation. The sett comprises the estates of West Chaiacombe and Leicester, and is granted for a term of 31 years, at 1-15th royalty. It extends over 150 acres of mineral ground, about three-quarters of a mile long on the course of the lodes, and is adjacent to the celebrated Old Combmartin Mines, which paid such handsome dividends to its shareholders. There are nine lodes opened in the sett, the properties and value of which are clearly stated in the annexed reports; and all that is necessary to make this a valuable and dividend-paying property is careful management and economic outlay. The series of rocks, of which the New Combmartin sett forms a part, is described by geologists to be of similar mineral formation to the productive mines of Germany and Brittany.

Mr. Evan Hopkins, F.G.S., considers some of the features affecting this property to resemble the Marquiza and St. Ana Silver Mines, and believes both the main lodes of Old Combmartin Mine continue through this sett. He believes that the angular appearances of these lodes, as well as the dislocations and contortions of the rocks they intersect, will produce large masses of argentiferous lead ores in this property, and sustain the character of the Combmartin district.

Mr. Nicholas Knorr regards the rock of Combmartin eminently adapted for producing silver-lead ores, which may be readily wrought by extensive adit levels on the lodes. Mr. Nicholas Whitley has published in his "Geological Transactions of Cornwall," his opinion that Combmartin district corresponds geologically and mineralogically to that of Liskeard, where rich silver-lead mines prevail.

A high opinion of the richness for silver and ore-producing capabilities of Combmartin is entertained at the Government School of Mines. The late Capt. Curlew, for many years agent to Messrs. Williams, endeavoured to obtain, while others offered a large sum for the lease of this property, of which he held the highest opinion, and in which he was supported by other very eminent mining authorities.

The numerous flookan lodes and cross-courses in this sett are masterly, well-defined and composed, having various angles of bearing—the former being N.W., N.E., and E. and W., while the latter run N. and S. The matrices of the ore are second to none, consisting of flookan, congenial friable spar, abundance of carbonate of lime, rich copper carbonate of iron, mundle, blende, oxide of iron, quartz, chlorite, &c. The probabilities of profitable lodes of ore being found at many of the very numerous junctions in this property are great.

Mining works of ancient date exist in New Combmartin sett, which collaterally greatly add to its value, inasmuch as the enormous discoveries of ore in Old Combmartin Mines in 1835 entirely arose from a resumption and pursuance, at a slightly deeper point, of precisely similar bygone works.

The almost perpendicular cliff which forms the north boundary of the sett is 50 fms. high, for three-quarters of a mile long, with the lodes cropping out therein, on the course of which adit levels can be immediately begun, and which can be met by deep levels on the same lodes from the south, so that the result of these natural favourable features, may be moderately estimated at a saving of £10,000, and the delay of many years is avoided.

There is an excellent stream of water for dressing and other purposes, and the carriage of materials, and freight of ore, &c., cannot be less anywhere than in this mine.

The ore already raised from this sett is of first-rate quality, and the reports hereto

appended show that, under judicious management, a most profitable mine at a small outlay will be the result. Indeed it is questionable if more than the allotment deposit will be needed.

£17 5*s.* per ton has been offered for the ore by Messrs. Sims and Williams, Llanelly. The present proprietors of this valuable property have agreed to accept out of the proposed capital the sum of £4000 in paid-up shares in the capital of the company.

The works will be commenced when one-half of the shares offered to the public are subscribed for; and if that amount be not subscribed for by the 2d of April, 1864, the deposits will then be returned in full.

Prospectuses, together with plans of the property, forms of application for shares, can be obtained, and specimens of the ore seen, on application to the secretary, at the offices of the company, and at Mr. J. D. Young's Foundry, Barnstaple.

## REPORTS.

Combmartin, July 27, 1863.—According to your request, I now send you my report on the New Combmartin Mine. The sett extends over 150 acres, and is about three-quarters of a mile in length in the direction of the lodes, situate a quarter of a mile north-west of the celebrated Old Combmartin Mine, county of Devon, which, when worked by the late company, produced such large quantities of silver-lead ore. The sett contains several lodes of an unusually promising character, and is embedded in a very kindly and encouraging stratum of blue clay-slate. There are also several well-defined cross-courses in the sett, as shown in the ground plan—their bearings about west of north, which will cross all the lodes in the said sett, and where those junctions take place we may reasonably expect to meet with deposits of silver-lead ore. I take this as my guide from what I experienced in the Old Combmartin Mine, in which I worked as a miner for five years.—Capel Lode: Its bearings about east and west of this lode; a level has been driven about 4 fms., and at that time, in consequence of a sufficient length of ground not being attainable, it was deemed unworthy of a company's notice, and discontinued; enough, however, being done to prove the character of the ground, and some beautiful specimens of quartz, gossan, mundle, with silver-lead ore were broken; the width of the lode about 4 ft.—Outer Holes Lode: This lode was operated on at the same time by the party that opened the before-mentioned lode, and driven on some 2 or 3 fms., showing lead ore more or less throughout the drive; bearings, 30° south of east.—Crown Lode: This lode is supposed to have been worked by the agents for the Crown some centuries since, and a level is driven on it a great length, which has fallen in; it is 3 ft. wide, being composed of flookan, gossan, quartz, mundle, and other favourable matrices; its bearings about 30° south of east.—Cliff Quartz Lode:







as with other commodities, the demand for more than its worth for the thing to be sold. The nation has nothing to the inventor, but sells him the right of his invention. In most countries, excepting England, the right of the inventor to the concession to work them for ever, is under other men's land, to his own profit; and the advantage which has resulted to the State where this rule has been adopted is universally acknowledged. The patent right in England is somewhat similar, but with the important difference that the concession to the discoverer is made for fourteen years only, instead of for ever, and that at the termination of that brief period the discoverer must permit every member of the community to participate in any benefits derivable from the discovery. When it can be proved that the needy working man considers a nominal decoration or even a knighthood equivalent to the means of obtaining something more than the bare necessities of life for himself and family, Mr. Macle's recommendation to confer such distinction, in lieu of granting patent rights, may be worthy of adoption in England.

Mr. Macle's pamphlet is admirably written, and contains a large amount of valuable information, more especially the abstracts of the opinions of some of the more influential anti-patent advocates of the Continent.

**NAVAL CONSTRUCTION.**—A useful little volume has just been issued, through Messrs. Spon, of Bucklersbury, by Mr. James Chalmers, entitled "England's Danger: the Admiralty Policy of Naval Construction." Mr. Chalmers treats the subject in sixteen chapters, and indisputably proves that some important change in the Government mode of treating inventors is absolutely necessary for the general safety of the community. Let it be enacted that the Government will, under no circumstances whatever, adopt the invention of a private individual, and inventors will not complain, provided they be given the guarantee that the Government servants will not appropriate discoveries, the exclusive use of which the Government has sold and conceded to others, in the form of a grant of letters patent. We have already expressed our conviction that the invention of Mr. John Clark, jun., has been infringed, both in the construction of the *Warrior* and on subsequent occasions; and, as Mr. Chalmers now makes a similar charge against the Admiralty as that of Mr. Clark, his seventh chapter, explaining how the deprecation is committed, will be read with general interest. He shows that, although the *Warrior* was constructed by him, was admitted to be stronger, cheaper, and lighter than that constructed by Mr. Reed, as nearly similar as he considered he could go, the question of deciding which system should be adopted was left to Mr. Reed himself, who, of course, decided in his own favor. Mr. Chalmers urges that there are substantial grounds for the complaint that so young and inexperienced a man as Mr. Reed should be permitted to occupy so important a position; but we are inclined to think that the entire system requires revision. We have no hesitation in commending Mr. Chalmers' look to all inventors who have dealings with Government officials.

**COMPENSATION TO LANDOWNERS.**—Mr. G. V. Yool, to whose popular essay on Waste, Nuisance, and Trespass we have already favourably alluded, has just issued, through Mr. Maxwell, of Bell-yard, an equally useful little treatise, entitled "Compensation to Landowners: being a practical digest of the law of compensation." The subject is treated so as to be readily understood by those not connected with the legal profession, and its careful perusal will doubtless prevent much useless litigation. His concluding remarks, pointing out the defects in the existing state of the law, owing to the altered condition of things arising from the construction of railways through towns, are particularly valuable.

**BALANTYNE'S MISCELLANY.**—The first three volumes of the very interesting series issued under this general title have just been published. The object has been to provide the less wealthy with stories of an amusing and instructive nature and healthy tone. The shilling volumes are well printed and elegantly bound, whilst each carefully selected chromo-lithograph accompanies each. A complete and distinct story is contained in each volume—these before us comprise, *Fighting the Whales, or Dangers and Dangers on a Fishing Cruise; Away in the Wilderness, or Life among the Red Indians and Fur Traders of North America; Fast in the Ice, or Adventures in the Polar Regions; and These in course of preparation, to judge from the titles, will be equally attractive.* The *Miscellany* will be complete in about 20 volumes, and will form one of the cheapest and best entertaining libraries which the working classes can possess.

**ROYAL INSURANCE COMPANY'S ALMANAC.**—The almanac and diary issued by the Royal Insurance Company for the present year is printed in the usual excellent style of the company's publications, and contains, in addition to the ordinary calendar matter, a large amount of useful information. Truly "the Royal" is deservedly a successful company—remarkable for spirit in its managerial arrangements, and promptness in its financial settlements.

**THE COAL TRADE OF NEW SOUTH WALES.**—The Australian Agricultural Company's report, read at the meeting on Tuesday, referring to the prospects of the Coal Trade, says:—"We cannot venture to say when a favourable turn may be expected; at present the supply is far in excess of the demand, and the considerable reduction which has been made in prices has failed to restore the custom which this company formerly enjoyed. Two new companies have lately commenced operations, and have aggravated the causes from which our trade has suffered during the last two years. As the out-turn of the operations cannot be satisfactory, it is only reasonable to suppose that for the present the attention of capitalists will be directed to other fields of investment. Considering the extent of the coal field of New South Wales, it must have been foreseen that the profitable monopoly enjoyed for many years by this and one other company would be broken up, and it was an obvious consequence of this competition that, during the interval while the trade was still confined within its original limits, it would prove disastrous to all concerned in it. It is, however, borne in mind that nothing short of the pressure which competition has produced would carry the trade into foreign ports, and it is there that the coal companies must look for a demand proportionate to the means of supply. This extension of the trade we believe to be on the eve of accomplishment, and in proof of it, we have the satisfaction of informing you that we have entered into a contract for the supply of 20,000 tons for eastern ports. Again, the recent rise in the price of English coal encourages the hope that shipments from the country to the East will be less heavy than they have been; but, on the other hand, the low rate of outward freight is a circumstance that still operates to our prejudice, and so long as the bulk of the cotton supply comes from India, no favourable change can be looked for. Again, it is an encouraging fact, that the coal of New South Wales is more fairly appreciated than it was; a few years ago it was difficult to induce any of the ocean companies to use this coal; if tried, it was condemned by the engineers as unserviceable, though English coal, which costs 300 per cent. more, is only 10 per cent. better. But these prejudices are gradually giving way under the test of experience, and colonial fuel is now used by the Peninsular and Oriental Company between King George's Sound and Sydney, a distance of 2000 miles—without detriment to the efficiency of their service. It is also a fact worthy of remark, that steam is beginning to supersede sails, even for cargo traffic, in all parts of the world. Within the last few weeks, an influential company has been formed for working a fleet of steamers with auxiliary power between Liverpool and Melbourne, and it is not improbable that another will be shortly announced with the same object between London and Sydney. There is, however, one great obstacle to the full development of this export trade, which we hope to see shortly removed; that is, the uncertainty and cost of delivering coal at the principal colonial ports. The freight to Sydney, which is only 60 miles from Newcastle, adds 50 per cent., and to Melbourne it adds 200 per cent. to the Newcastle price, and when southerly winds prevail the supply is entirely stopped. Owing to both these causes the export trade is kept down; for the uncertainty of getting his cargo as soon as the ship is ready for it is a serious detriment to the shipowner, and if the cost price is loaded with heavy charges for coasting freight, he enters the foreign markets at a disadvantage. Under these circumstances, it appears that the export coal trade of Newcastle needs for its full development the co-operation of a steam collier company, and we believe that a large field exists for the profitable employment of capital in this way. In the meantime, while these indications of future improvement are in the course of realization, our policy is clear, and that is to reduce our expenditure as much as possible; and with this object we have consented to lay off all the old pits, thereby confining our operations to the new pit, No. 2, which will supply a very much larger quantity of coal than was obtained in former years from all the old pits together. The revenue of the collieries of this company has been materially reduced, first by two strikes among the colliers when prices were remunerative, and secondly by loss of trade and reduction of prices, which followed the opening of fresh pits by new companies without any corresponding increase of consumption.

**BORING AND MINING APPARATUS.**—Messrs. J. Munro, of Tiltanburn, and H. Scott, of Cambusnethan, have patented an improved arrangement of boring, mining, and excavating apparatus. The principal claims are the working of a reciprocating tool by the direct action of a piston or pistons moving angularly in segmental chambers; the working of the pick by pistons rigidly attached thereto, and moving in a segmental chamber; and the using of a confined pressure chamber, or its equivalent, independent of the main boiler, to act in connection with the pistons.

**ACCELERATING THE DRAFT IN FURNACES.**—An invention has been patented by Mr. J. J. Pote, of St. Quentin, France, which consists in causing the smoke and products of combustion to enter a flue, pipe, or conduit, which is made to pass through, or is otherwise heated by the fire itself. The portion of the pipe so heated causes the acceleration of the draft.

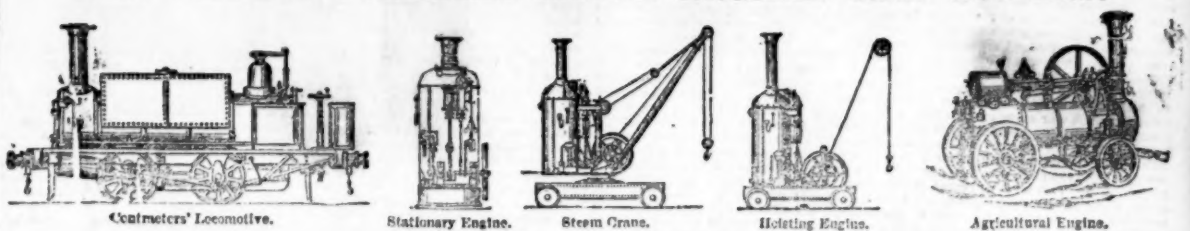
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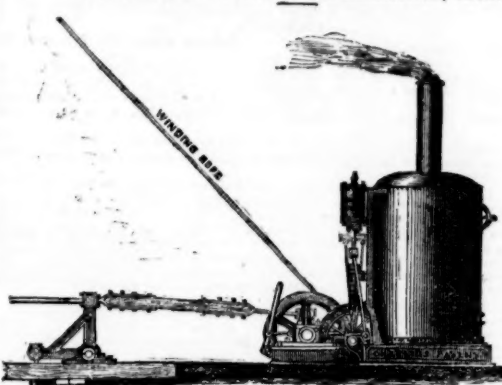
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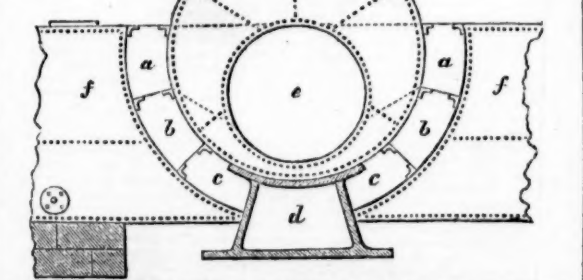
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The advantages of this boiler, an illustrated description of which was published in the *Mining Journal* of October 3, are obvious. It is provided with WROUGHT IRON FLUES, conveying the fire entirely over the surface of boiler below the water line, and wholly doing away with lime coming in contact with any part of the boiler, lime having been found to destroy the boiler plates before any other parts are the worse for wear. This boiler has four additional flues to the plan at present adopted, thus affording a FAR GREATER AMOUNT OF HEATING SURFACE, and MORE EFFECTUALLY CONSUMING THE GASES. Between the boilers a wrought-iron tank is fixed, extending the whole length of the boilers, for containing water for feed; this water will pass into the boiler at any temperature required. This boiler will not require anyone to enter the flues for cleaning, as the flues are provided with shifting stoppers at the ends, enabling a person to cleanse the flues even while the boiler is hot; this plan answers for any size or length boiler, and will do away with the cold water feed, which has been the cause of so many accidents. These flues are made of wrought or cast-iron. On the top of the tank a pipe will be placed, to take the waste steam that escapes and carry it to the chimneys. The flues for a 6 ft. boiler will be 2 ft. long, and the usual width. It must be remembered that the tank once hot will remain a hot body, with the same amount of heat that passed off before in the brick flues. I would observe that there will be no more water taken from these tanks than will be required for the feed, consequently no more cold water will pass into these tanks than will be necessary for feeding. It is believed this plan will SAVE TEN FEET IN THE LENGTH OF BOILER, and it has been proved to EFFECT A SAVING OF RATHER MORE THAN ONE-THIRD IN THE CONSUMPTION OF FUEL. These boilers, with flues and tanks, can be supplied on the most reasonable terms.

NOTE.—This plan of Flues and Tank Boiler will be found very beneficial for MARINE ENGINES; the tank would receive the water from the sea, and would not only become hot for feed, but would be the means of preventing in a great measure the salt from passing into the boiler. Where great quantities of hot water are required for other purposes, these tanks will also be found very beneficial.

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